

DICOM Correction Proposal

STATUS	
Date of Last Update	2015/04/10
Person Assigned	
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Correction Number	CP-1423
Log Summary:	Extending RFC 3240 with DICOM-Mime header fields
Name of Standard:	PS 3.12 2015a / RFC 3240

Rationale for Correction:

The option to send a DICOMDIR has been defined for image sets that have been sent in a single e-mail. This is a useful option in use cases in which all DICOM objects are already available at the time of transmission. In many Teleradiology scenarios, images are normally sent immediately after creation with one image per e-mail. In such scenarios, DICOMDIR does not provide continuous information about the number an object carries in a set of transmitted objects. In order to define comprehensive e-mail sets it is useful to define and register additional message header fields that provide the required information.

Up to now the MIME standard does not define such mechanism to "bundle" a set of associated e-mails similar to a DICOM object that is belonging to a series / study defined by a Series- or StudyUID and labeled with an ImageID. (This "bundling" is not to be confound with message partial - RFC 2046). The following figure 1 demonstrates the two different mechanisms.

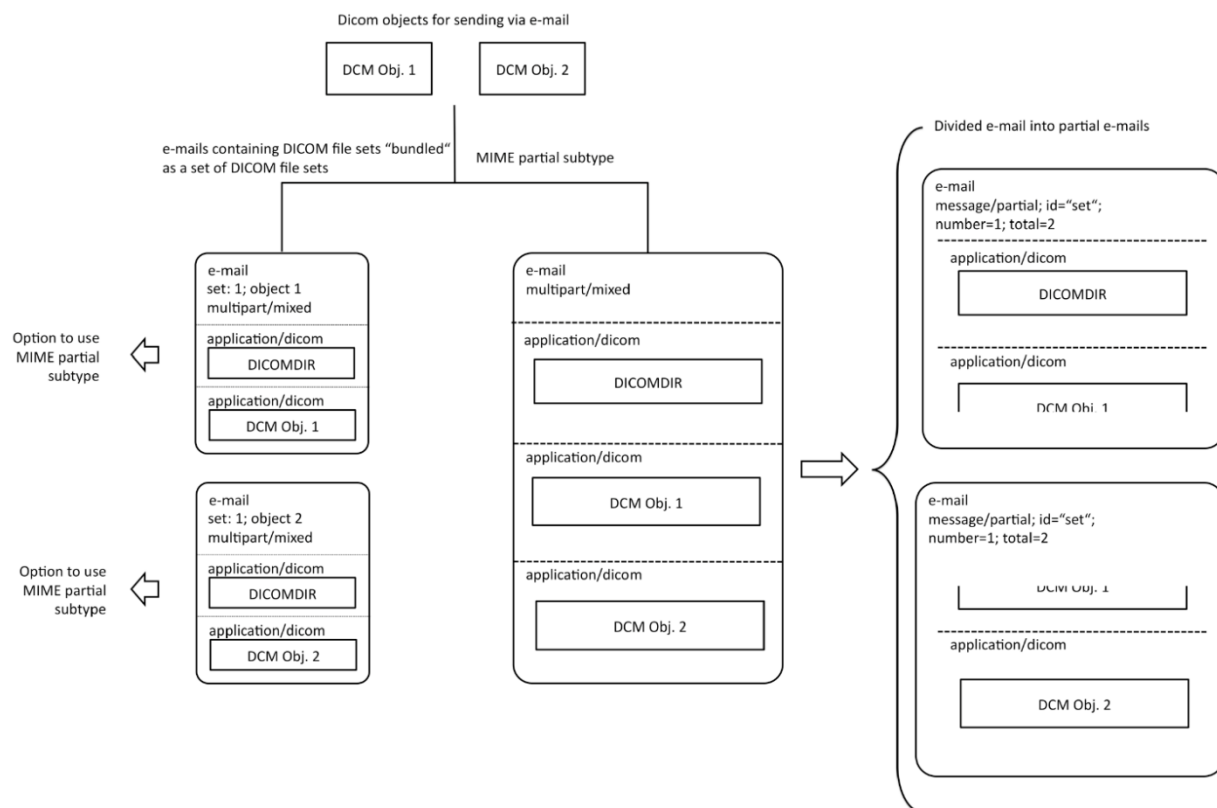


figure 1 – differences between e-mail set and MIME partial subtype (RFC 2046)

Using DICOMDIR as the only mechanism for "bundling" transfer data has another disadvantage. According to the definition in PS 3.11 G.2.1.1 all data must be sent in one e-mail. In practice this leads to very large e-mails, which are most likely to be split up into small slices using the MIME partial subtype (RFC 2046). If the transmission of one of these e-mail parts fails the whole e-mail must be re-sent. This can be avoided by transmitting only one DICOM object per e-mail. That way only corrupted e-mails need to be re-sent for the price of losing the ability of given feedback to the users about the transmission status. In order to re-gain transmission status information "bundling" of e-mails as described above would eliminate that difficulty.

Correction Wording:

Registering the dicom-mime message header fields as "Permanent Message Header Fields". The Procedure is laid out in RFC 3864.

A new RFC must be written as an update to the existing RFC 3240. This new RFC will register the three new message header fields, which are described as follows:

- Dicom-Mime field definitions

The field definitions follow the requirements of RFC 2822.

Field	Min number	Max number	Notes*
dicom-mime-set-id	0	1	
dicom-mime-set-part	0*	1	mandatory if header field dicom-mime-set-id is present
dicom-mime-set-total	0*	1	mandatory for the last e-mail of a set if header field dicom-mime-set-id is present

dicom-mime-set-id field

The dicom-mime-set-id field consists of the field name Dicom-Mime-Set-Id and a worldwide unique identifier (e.g. as used for the message-id [RFC 5322]). The field's value uniquely identifies a set of associated e-mails. A set consists of all e-mails belonging to a batch order of an arbitrary number of DICOM objects as defined in part 12 of the DICOM standard, Annex K DICOM MIME media [DICOM PS3.12]. The syntax for using this field is as follows:

```
dicom-mime-set-id = "Dicom-Mime-Set-Id:" unique id CRLF
```

dicom-mime-set-part field

The dicom-mime-set-part field consists of the field name Dicom-Mime-Set-Part and a number (digits only). The Dicom-Set-Part values of a set must be consecutive without gaps. Leading zeros (e.g. 0001) are allowed. It represents the set-wide unique identifying number of the e-mail. The syntax for using this field is as follows:

```
dicom-mime-set-part = "Dicom-Mime-Set-Part:" n*DIGIT CRLF
```

dicom-mime-set-total field

The dicom-mime-set-total field consists of the field name Dicom-Mime-Set-Total and a number (digits only). It represents the total count of e-mails belonging to a set. Leading zeros (e.g. 0011) are allowed. The syntax for using this field is as follows:

```
dicom-mime-set-total = "Dicom-Mime-Set-Total:" n*DIGIT CRLF
```

PS 3.12 Adding the possibility for defining a transmission set as described in the new RFC

K.1.1 DICOM File Set

One DICOM File set shall be contained in a MIME Multipart/mixed or Multipart/related Media Type, called "DICOM File set" MIME Entity.

Note

1. *It may be necessary to fragment a message by using the Message/partial Media Type format.*
2. *A "DICOM File set" MIME Entity may contain MIME Parts other than Application/dicom, which may be ignored by the DICOM application.*

is to be changed into

K.1.1 DICOM File Set

One DICOM File set shall be contained in a MIME Multipart/mixed or Multipart/related Media Type, called "DICOM File set" MIME Entity.

Note

1. *It may be necessary to fragment a message by using the Message/partial Media Type format.*
2. *A "DICOM File set" MIME Entity may contain MIME Parts other than Application/dicom, which may be ignored by the DICOM application.*
3. *Multiple "DICOM File sets" may be combined as a message set as defined in RFC <new RFC#>*

PS 3.12 Adding a new section for the text of the new RFC

The text of the new RFC must be copied into a new section

RFC <new number> - Digital Imaging and Communications in Medicine (DICOM) - Mail Header Fields Registration (Informative)

behind

L RFC 320 – Digital Imaging and Communications in Medicine (dicom) – Application/dicom MIME Sub-type Registration (Informative)

PS 3.12 Adding the following example to the existing examples of RFC 3240

Upon adding the example to PS 3.12 the placeholder <new RFC #> must be replaced by the correct RFC number.

Example 3: DICOM MIME Type message set (Informative)

```
// e-mail 1 of 2
```

```
From: "Dr Smith" <smith@provider1.com>
```

To: "Dr Johnson" <johnson@provider2.com>

Subject: test DICOM Mime Type

Date: Fri, 5 Nov 1999 15:15:35 +0100

Message-ID:

uMTAwMDguNS4xLjQuMS4xLjcAAgADAFVJFgBFfe@provider1_19991105151535_Smith

Dicom-Mime-Set-Id:

gBVSRyAMS4yLjI1MC4xLjU5L@provider1_19991105151535_to_Johnson

Dicom-Mime-Set-Part: 1

MIME-Version: 1.0 Content-Type: Multipart/mixed;

boundary="-----=_NextPart_000_0027_01BF27A0.9BE21980"

This is a multi-part message in MIME format as defined by RFC 3240 and RFC <new RFC #>

-----=_NextPart_000_0027_01BF27A0.9BE21980 Content-Type: text/plain;

charset="iso-8859-1" Content-Transfer-Encoding: 7bit

-----=_NextPart_000_0027_01BF27A0.9BE21980 20 Content-Type: Application/dicom;

name="i00023.dcm"

Content-Transfer-Encoding: base64

byEAALcAAABbAA
 AA
 AAAAAAAAAAAAAAAAAABESUNNagAAAFVMBACgAAAAAgABAE9CAAACAAAAAAECAAIAVUkaADEuMi44
 NDAuMTAwMDguNS4xLjQuMS4xLjcAAgADAFVJFgBFfeGFtaW5lZC1ieS1ESUNPTS4xLjEAAgAQAFVJ
 FgAAAAAAAAAAAAAAAAAFu3LQAAAC3iQAAALeYLR4AAAFu3LQAAAAAAAAAAAAAAAAAFu3LQAAAC3
 iQAAALeJAAAAAAAAFu3t7e3WwAAAAAAAAAAAAAAAAABYtDwAAAAAtHgAAAC0eAAAAABYtLS0tFgAAAAA=
 -----=_NextPart_000_0027_01BF27A0.9BE21980--

// e-mail 2 of 2

From: "Dr Smith" <smith@provider1.com> To: "Dr Johnson" <johnson@provider2.com>

Subject: test DICOM Mime Type

Date: Fri, 5 Nov 1999 15:15:40 +0100

Message-ID: uM128654099887632482390482093848@provider1_19991105151535_Smith

Dicom-Mime-Set-Id:

gBVSRyAMS4yLjI1MC4xLjU5L@provider1_19991105151535_to_Johnson

Dicom-Mime-Set-Part:2

Dicom-Mime-Set-Total:2

```
MIME-Version: 1.0 Content-Type: Multipart/mixed;
boundary="-----_NextPart_000_0027_01BF27A0.9BE21980"
This is a multi-part message in MIME format.
-----_NextPart_000_0027_01BF27A0.9BE21980 Content-Type: text/plain;
charset="iso-8859-1" Content-Transfer-Encoding: 7bit

-----_NextPart_000_0027_01BF27A0.9BE21980 20 Content-Type:
Application/dicom;
name="i00023.dcm"

Content-Transfer-Encoding: base64

byEAALcAAABbAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAABESUNNagAAAFVMBACgAAAAAgABAE9CAAACAAAAAEECAAI
AVUkaADEuMi44
NDAuMTAwMDguNS4xLjQuMS4xLjJcAAgADAFVJFgBFegFtaW5lZC1ieS1ESUNPTS4xLjE
AAgAQAFVJ
FgAAAAAAAAAAAAAFu3LQAAAAC3iQAAALeYLR4AAFu3LQAAAAAAAAAAAAAFu3LQAAAAC3
iQAAALeJAAAAAFu3t7e3WwAAAAAAAAAAAAAABYtDwAAAAAtHgAAAC0eAAAAABytLS0tFg
AAAAA=

-----_NextPart_000_0027_01BF27A0.9BE21980--
```

PS 3.12 Updating Normative References

The following reference must be added to 2. Normative References (PS. 3.12)
RFC <new RFC#>, Digital Imaging and Communications in Medicine (DICOM) – Mail Header Fields Registration

PS 3.18 Adding RFC reference

The following reference must be added
IETF RFC 3240 Application/dicom MIME Sub-type Registration <http://tools.ietf.org/html/rfc<new RFC#>>

PS 3.18 Updating RFC reference

6.3.1.1 MIME Type

The MIME type shall be ‘application/dicom’, as specified in IETF RFC3240
into

6.3.1.1 MIME Type

The MIME type shall be ‘application/dicom’, as specified in IETF RFC3240 and
RFC<new RFC #>

PS 3.19 Adding RFC reference

The following reference must be added to 2. Normative References

IETF RFC <new RFC #> Digital Imaging and Communications in Medicine (DICOM) - Mail Header Fields Registration